On the emission of pollutants after blending conventional fuels with renewable fuels.

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Abstract

The combustion of conventional fuels (Diesel and Jet A-1) with 10-20% vol. oxygenated fuels (ethanol, 1-butanol, methyloctanoate, diethylcarbonate, tri(propylene glycol)methyl ether, and 2,5dimethylfuran), synthetic paraffinic kerosene, and rapeseed oil methyl ester was studied. The experiments were performed using a laboratory premixed flame operated at atmospheric pressure and a four-cylinder four-stroke Diesel engine operating at 1500 RPM. Soot samples from kerosene blends were collected above a premixed flame for analysis. Polyaromatic hydrocarbons (PAHs) were extracted from the soot samples. After fractioning, they were analyzed by high-pressure liquid chromatography with UV and fluorescence detectors. Carbonyl compounds (C₁ to C₈) were collected at the engine exhaust on DNPH-coated cartridges and analyzed by high-pressure liquid chromatography with UV detection. The data indicated that blending conventional fuels with biofuels has a significant impact on both carbonyl compounds emissions and PAHs adsorbed on soot.